Eth

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/964,766	09/28/2001	Walter Joseph Carpini	78945-13/jlo	2984

29382 7590 10/17/2005

TROPIC NETWORKS INC.
DR. VICTORIA DONNELLY
135 MICHAEL COWPLAND DRIVE
KANATA, ON K2M 2E9
CANADA

EXAMINER	
KHOO, FOONG LIN	

ART UNIT	PAPER NUMBER
2664	

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/964,766	CARPINI ET AL.	
	Examiner	Art Unit	
	F. Lin Khoo	2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55,73 and 74* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-55, 73-74* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/05/02, 5/23/03*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because:

(i) same reference character "323" has been used in three (3) instances to designate different entities, communication link, segment and section in Fig. 13. They are all different elements.

(ii) same reference character "335" has been used in two (2) instances to designate different entities bridge link and communication link in Fig. 13. They are all different elements.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

(i) On page 38, line 28, “the primary path 603” is not shown in Fig. 12.

(ii) On page 41, line 1, “alternate paths 235, 237” are not shown in Fig. 13.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-15, 19-21, 23, 26-38, 39-40, 42-48, 49-55 are rejected under 35 U.S.C. 102(e) as being anticipated by Kodialam et al. (U.S. Pub 2002/0067693).

Regarding Claim 1, Kodialam et al. discloses a communication network including a first communication path having a plurality of switching routers, a second communication path having at least one communication path element different from said first communication path and extending from a selected one of said switching routers to a position on said first communication path located at a distance from said selected switching router of less than the length of said first communication path, wherein said selected switching router includes output means for outputting data with a label for routing data along one of said first and second communication paths, and routing means responsive to a fault in the transmission capability of said first communication path between said selected switching router and said position for routing data received by said selected switching router for transmission along said first communication path,

along said second communication path (Fig. 3, elements 301,302 through 312 are a plurality routers of nodes (paragraph[0036]). See paragraphs [0010], [0027], [0028]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism. The primary path or link from node 302 to 312 is from link 302 to 303, link 303 to 304 and link 304 to 312. Fig. 3 shows a single-link failure of link l(303, 304), and the information transfer, since local restoration is employed, travels to only node 303, which initiates a transfer to a backup path (second communication path) over links l(303, 308) and l(308, 304) through node 308. The selected switching node 303 to link 308 and 304 is less than the length of first communication path (the primary path)).

Regarding Claim 2, Kodialam et al. discloses wherein said first communication path includes a first switching router (Fig. 3, element 302), a second switching router (Fig. 3, element 303) downstream of said first switching router, and a third switching router downstream of said second switching router (Fig. 3, element 312), and said selected switching router (Fig. 3, element 303) comprises said second switching router (See paragraphs [0027], [0028]).

Regarding Claim 3, Kodialam et al. discloses wherein said second switching router includes enabling means for enabling said routing means to output data specified for transmission on said first communication path, onto said second communication path with a label for routing said data along said second communication path (See

paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 4, Kodialam et al. discloses wherein said enabling means comprises a machine readable instruction [See paragraph 0073].

Regarding Claim 5, Kodialam et al. discloses wherein said second switching router comprises a memory storing said machine readable instruction [See paragraph 0073].

Regarding Claim 6, Kodialam et al. discloses wherein said second switching router is configured to read a label associated with received data and to identify therefrom data specified for transmission on said first communication path (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 7, Kodialam et al. discloses wherein said second switching router further comprises label switched path establishing means for establishing a label switched path on said second communication path for carrying data specified for transmission on said first communication path (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 8, Kodialam et al. discloses wherein said label switched path establishing means is adapted to establish said label switched path in response to a fault in the transmission capability of said first communication path (See paragraphs [0010], [0027], [0028]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 9, Kodialam et al. discloses further comprising secondary path determining means responsive to the location of a fault on the first communication path for determining said second communication path to bypass said location (See paragraphs [0010], [0027], [0028]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism. The primary path or link from node 302 to 312 is from link 302 to 303, link 303 to 304 and link 304 to 312. Fig. 3 shows a single-link failure of link l(303, 304), and the information transfer, since local restoration is employed, travels to only node 303, which initiates a transfer to a backup path (second communication path) over links l(303, 308) and l(308, 304) through node 308).

Regarding Claim 10, Kodialam et al. discloses wherein said path determining means includes selection means for selecting said second communication path from a plurality of communication paths (Fig. 5. See paragraphs [0029], [0030], [0031], [0037]. For single-element failures, the backup path for the failure of node k includes several

steps. First, determine the incoming and outgoing links l(j,k) and l(k,m) in the active path passing through node k. If node k fails, all links incident on node k fail, and in particular, link l(i,k). Therefore the failure will be detected at node j and if there is an alternate path from node j to node m (or some other node between m and the destination t) then node j can divert traffic along this backup path. The backup path for the failure of node k avoids all links incident on node k. Generating bypass links for the single-node failure also provides backup paths for link failures as in the case for selecting said second communication path from a plurality of communication paths).

Regarding Claim 11, Kodialam et al. discloses wherein said selection means is adapted to select as said second communication path, the path having the shortest data transmission time (See paragraph [0036]. Dynamic backup routing disclosed employs repeated invocations of a shortest path routing algorithm, such as Dijkstra's algorithm, to generate links for the backup path. The shortest path routing is associated with having the short data transmission time).

Regarding Claim 12, Kodialam et al. discloses wherein said second switching router further comprises secondary path determining means for discovering at least one secondary path (Fig. 3, See paragraphs [0028], [0029]. For single-element failures, the backup path for the failure of node k includes several steps. First, determine the incoming and outgoing links l(j,k) and l(k,m) in the active path passing through node k. If node k fails, all links incident on node k fail, and in particular, link l(i,k). Therefore the

failure will be detected at node j and if there is an alternate path from node j to node m (or some other node between m and the destination t) then node j can divert traffic along this backup path. The backup path for the failure of node k avoids all links incident on node k. Generating bypass links for the single-node failure also provides backup paths for link failures which is associated with second switching router further comprises secondary path determining means for discovering at least one secondary path).

Regarding Claim 13, Kodialam et al. discloses wherein said determining means is adapted to determine the value of a parameter defining the or each second communication path (See paragraph [0036]. Dynamic backup routing employs repeated invocations of a shortest path routing algorithm, such as Dijkstra's algorithm, to generate links for the backup path. To generate a forwarding table, each router of a node computes a set of preferred paths through the network nodes, and may use link weighting to calculate the set of preferred paths. Link weighting is implemented by assigning usage costs to back-up links based on a predefined cost criterion and this is equivalent to determining the value of a parameter defining the or each second communication path).

Regarding Claim 14, Kodialam et al. discloses wherein said determining means is adapted to select a secondary path based on the determined value(s) of said parameter (See paragraph [0036]. Each preferred path has a minimum total weight between nodes as well as a minimum summed weight through nodes of the path, which

is known in the art as shortest-path routing. The minimum total weight between nodes as well as a minimum summed weight through nodes of the path is the parameter used to select a secondary path based on the determined value).

Regarding Claim 15, Kodialam et al. discloses wherein said parameter is the data transmission time over the secondary path, and the selection means is adapted to select as said second communication path, the path having the shortest data transmission time (See paragraph [0036]. Dynamic backup routing disclosed employs repeated invocations of a shortest path routing algorithm, such as Dijkstra's algorithm, to generate links for the backup path. The shortest path routing is associated with the parameter related to data transmission time wherein the shortest path provides the path having the shortest data transmission time).

Regarding Claim 19, Kodialam et al. discloses wherein said first communication path includes a plurality of intermediate switching routers between said first switching router and said third switching router, a first label switched path is established on said first communication path which originates at said first switching router and terminates at said third switching router, and wherein said second switching router is selected from said plurality of intermediate switching routers as the switching router such that the difference in the transmission time on each section of the first communication path between itself and the first switching router and itself and the third switching router is a minimum (Fig. 3, element 302 (first switching router), element 303 (second switching

router) and element 312 (third switching router). See paragraphs [0037 through 0042]. In Fig. 5, step 505, the shortest path through the network is generated and this is associated with the difference in the transmission time on each section of the first communication path between itself and the first switching router and itself and the third switching router being a minimum).

Regarding Claim 20, Kodialam et al. discloses comprising a plurality of intermediate switching routers between said first and third switching routers, a first label switched path established on said first communication path which originates at said first switching router and terminates at said third switching router, said intermediate switching routers including a plurality of said selected switching routers, each having a second communication path extending therefrom to a position on said first communication path located at a distance from a respective selected switching router of less than the length of said first communication path, and wherein the selected switching routers are selected from said plurality of intermediate switching routers such that any difference in the data transmission time on each section of the first communication path between each pair of neighbouring selected switching routers is a minimum (Fig. 3, element 302 (first switching router), element 303 (second switching router) and element 312 (third switching router). The first communication path is 302 to 303 to 304 to 312. Each node 301, 302, 303, 304 has a secondary path (e.g. for node 303, the secondary path is 303 to 308 to 304, for node 302, the secondary path is 302 to 307 to 308, to 304). Each of the secondary path is less than the length of first

communication path. See paragraph [0057]. To account for the backup path for link l(i, j) starting at node i but ending at any node on the path from j to t (including j and t), the above-described method of link usage cost and backup path cost calculation is modified as follows. The shortest path (e.g., Dijkstra's) algorithm is executed backwards starting at the destination node (termed the "sink" of the graph) for each node between destination node t and node j. Each of the series of shortest-path computations is executed by finding the shortest path backwards from the destination node t to the source node s. Based on the disclosed series of shortest-path computations any difference in the data transmission time on each section of the first communication path between each pair of neighbouring selected switching routers is a minimum).

Regarding Claim 21, Kodialam et al. discloses wherein said second communication path is selected to share the minimum number of communication links with said first communication path (Fig. 1, Fig. 2 and Fig. 5. See paragraphs [0026, 0040]. At step 503, each usage cost is generated as the cost of using one or more given links disjoint from the active path link to backup the link in the active path. The usage costs are computed with multiple invocations of a shortest-path computation for each partial backup path including the link because the backup path for a link can terminate at any point (node) on the path from that link to the destination. Using one or more given links disjoint from the active path link to backup the link in the active path is associated with the second communication path selected to share the minimum number

of communication links with first communication path. Fig.1 and Fig. 2 show no links and nodes being shared between the path 101 and 102).

Regarding Claim 23, Kodialam et al. discloses comprising a plurality of intermediate switching routers between said first switching router and said third switching router, each being connected to said second communication path by a respective intermediate communication path, and wherein said selected switching router is that which is connected to said second communication path by the intermediate communication path having the shortest data transmission time (Fig. 3, element 302 (first switching router), element 303 (second switching router) and element 312 (third switching router). The intermediate communication path is 302 to 303 as an example. Each node 301, 302, 303, 304 has a secondary path (e.g. for node 303, the secondary path is 303 to 308 to 304, for node 302, the secondary path is 302 to 307 to 308, to 304). Secondary Each of the secondary path is less than the length of first communication path. See paragraphs [0037 through 0042]. In Fig. 5, step 505, the shortest path through the network is generated and this is associated with selected switching router which is connected to second communication path by the intermediate communication path having the shortest data transmission time).

Regarding Claim 26, Kodialam et al. discloses wherein said second switching router includes enabling means for enabling said routing means to output data specified for transmission on said first communication path, onto said first communication path

with a label for routing said data along said first communication path (Fig. 3. See paragraph [0007, 0009]. The transmission of data on first communication path is associated with routing data from a node to another node (node 302 to 303, 303 to 304 and 304 to 312). The Multi-Protocol Label Switched (MPLS) standard allows such routing protocols for traffic management. A label is employed by routers of the network to forward the corresponding packet).

Regarding Claim 27, Kodialam et al. discloses comprising a label switched path on said first communication path which originates at said first switching router and terminates at said third switching router, and wherein the length of said label switched path defines the length of said first communication path (Fig. 3, element 302 (first switching router) and element 312 (third switching router). See paragraph [0007, 0009]. The Multi-Protocol Label Switched (MPLS) standard allows such routing protocols for traffic management. The label is related to specific origination and termination address fields in the header of the received packet which is associated with the label switched path defining the length of first communication path between the first (origination) and third (termination) switching routers).

Regarding Claim 28, Kodialam et al. discloses an intermediate switching router between said second switching router and said third switching router, said second communication path adjoining said first communication path at said intermediate switching router, and wherein said intermediate switching router includes enabling

means for enabling said intermediate switching router to direct data received on said second communication path intended for transmission on said first communication path onto said first communication path (Fig. 3, element 304 is the intermediate node (router) between second switching router (element 303) and third switching router (element 312). See paragraph [0028]. The first communication path is via node 302 to 303, 303 to 304 and 304 to 312. When link between 303 and 304 fails, the data from first communication path is routed via second communication path 303 to 308 to 304. At 304, the data is routed back to the first communication path which is equivalent to the intermediate switching router to direct data received on second communication path intended for transmission on first communication path onto first communication path).

Regarding Claim 29, Kodialam et al. discloses a label switched path established on said first communication path, and wherein said intermediate switching router is adapted to label data received from said second communication path intended for transmission on said first communication path with a label defining said label switched path on said first communication path (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 30, Kodialam et al. discloses wherein said first communication path includes a first switching router, a second switching router downstream of said first switching router and a third switching router downstream of said second switching

router, and wherein said a second communication path extends from said second switching router to a predetermined point on said first communication path downstream of said second switching router, said second switching router being adapted to route data over said first communication path in response to a predetermined label associated with said data, and having re-routing means responsive to a fault condition in the transmission capability of said first communication path between said second switching router and said predetermined point for re-routing data received by said second switching router from said first switching router along said second communication path (Fig. 3, element 302 (first switching router), element 303 (second switching router), element 312 (third switching router) and element 304 (predetermined point). See paragraphs [0010,0028]. The first communication path is via node 302 to 303, 303 to 304 and 304 to 312. When link between 303 and 304 fails, the data from first communication path is routed via second communication path 303 to 308 to 304 and at 304, the data is routed back to the first communication path which is associated with re-routing means responsive to a fault condition in the transmission capability of said first communication path between second switching router and predetermined point for re-routing data received by second switching router from first switching router along second communication path. Note: The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 31, Kodialam et al. discloses wherein said second communication path includes a switching router between said second switching router and said predetermined point, and said switching router of said second communication path is adapted to route data received by said second switching router intended for further transmission along said first communication path to said third switching router, along said second communication path in response to a predetermined label associated with said data (Fig. 3, element 303 (second switching router), element 304 (predetermined point), element 308 (a switching router between second switching router and predetermined point) and element 312 (third switching router). See paragraphs [0010, 0028]. The first communication path is via node 302 to 303, 303 to 304 and 304 to 312. When link between 303 and 304 fails, the data from first communication path is routed via second communication path 303 to 308 to 304 and back to first communication path to 312. Note: The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 32, Kodialam et al. discloses wherein said first communication path includes a further switching router between said second switching router and said third switching router, and wherein said second communication path joins said first communication path at said further switching router or downstream of said further switching router (Fig. 3, element 303 (second switching router), element 312 (third switching router) and element 304 (a further switching router between second switching

router and third switching router). See paragraph [0028]. The first communication path is via node 302 to 303, 303 to 304 and 304 to 312. The second communication path is via nodes 303 to 308 to 304. At 304, second communication path joins first communication path at further switching router).

Regarding Claim 33, Kodialam et al. discloses further comprising a third communication path between said further switching router and a second predetermined point along said first communication path downstream of said further switching router, and wherein said further switching router includes re-routing means responsive to a fault condition in the data transmission capability of the first communication path between said further switching router and second predetermined point for re-routing data received by said further switching router intended for further transmission along said first communication path to said third switching router, along said third communication path (Fig. 3, element 304 (further switching router), element 312 (second predetermined point which is also associated with the third switching router). See paragraph [0028]. The first communication path is via node 302 to 303, 303 to 304 and 304 to 312. The second communication path is via nodes 303 to 308 to 304. The third communication path is via nodes 304 to 309 to 310 to 311 to 312. When link between 304 and 312 fails the data transmission along the first communication path is re-routed at 304 along the third communication path to third switching router).

Regarding Claim 34, Kodialam et al. discloses wherein said third communication path includes a switching router between said further switching router and said second predetermined point, and wherein said switching router of said third communication path is adapted to route data along said path in response to a label associated with the data transmitted from said further switching router (Fig. 3, element 304 (further switching router), element 312 (second predetermined point which is also associated with the third switching router). See paragraphs [0010, 0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. The second communication path is via nodes 303 to 308 to 304. The third communication path is via nodes 304 to 309 to 310 to 311 to 312. Element 309 is a switching router between the further switching router and second predetermined point in the third communication path adapted to route data along path in response to a label associated with the data transmitted from the further switching router. Note: The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 35, Kodialam et al. discloses including a further communication path extending from said first switching router and adjoining said first communication path at a predetermined point downstream of said first switching router, wherein said first switching router includes re-routing means responsive to a fault condition in the transmission capability of said first communication path between said first switching router and said predetermined point at which said further communication path joins said first communication path, for re-routing data intended for transmission along said first

communication path, along said further communication path (Fig. 3, element 302 (first switching router), element 304 (predetermined point). See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. A further communication path is via nodes 302 to 307 to 308 to 304. When links between 302 and 303 and 303 to 304 fail in the first communication path, the data on the first communication path at 302 is re-routed along the further communication path).

Regarding Claim 36, Kodialam et al. discloses wherein said further communication path includes a switching router between said first switching router and said predetermined point, said switching router being adapted to direct data from received from said first switching router intended for transmission along said first communication path along said further communication path in response to a label communicated with said data by said first switching router (Fig. 3, element 302 (first switching router), element 304 (predetermined point). See paragraphs [0010, 0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. A further communication path is via nodes 302 to 307 to 308 to 304. When links between 302 and 303 and 303 to 304 fail in the first communication path, the data on the first communication path at 302 is re-routed along the further communication path. Element 307 is a switching router between first switching router and predetermined point adapted to direct data from received from first switching router intended for transmission along first communication path along further communication path in response to a label communicated with data by said first switching router. Note: The Network Tunnel Path

(NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 37, Kodialam et al. discloses wherein said first communication path includes a first switching router, a second switching router downstream of said first switching router and a third switching router downstream of said second switching router, a second communication path extending from said first switching router to said second switching router, said second switching router being adapted to route data over said first communication path in response to a predetermined label associated with said data, and wherein said first switching router includes routing means responsive to a fault condition in the data transmission capability of said first communication path between said first switching router and said second switching router for re-routing data intended for transmission along said first communication path, along said second communication path (Fig. 3, element 302 (first switching router), element 304 (second switching router) and element 312 (third switching router). See paragraphs [0010, 0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. A second communication path is via nodes 302 to 307 to 308 to 304. When links between 302 and 303 and 303 to 304 fail in the first communication path, the data on the first communication path at 302 is re-routed along the second communication path in response to predetermined label associated with data. Note: The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 38, Kodialam et al. discloses wherein said second switching router is adapted to route data intended for transmission along said first communication path between said first switching router and said second switching router and received from said second communication path, along said first communication path, downstream thereof (Fig. 3, element 302 (first switching router), element 304 (second switching router) and element 312 (third switching router). See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. A second communication path is via nodes 302 to 307 to 308 to 304. Element 304 re-routes the data received from the second communication path to the first communication path downstream thereof).

Regarding Claim 39, Kodialam et al. discloses a method of conditioning a communication network to restore data transmission from a source node to a destination node in the event of a fault between an intermediate node and said destination node on a first communication path which includes said source node, said intermediate node and said destination node and defines a first label switched path originating at said source node and terminating at said destination node, the method comprising the steps of establishing a secondary label switched path, originating at said intermediate node, along a second communication path which bypasses said fault and re-joins said first communication path, and conditioning said intermediate node to direct data from said first label switched path to said second label switched path in response

to a fault on said first communication path between said intermediate node and said destination node (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node). See paragraphs [0009, 0010, 0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. A second communication path is via nodes 303 to 308 to 304. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism associated with first label switched path originating at source node and secondary label switch path originating at intermediate node. When link between 303 and 304 fails in the first communication path, the data from first communication path is routed via second communication path 303 to 308 to 304 and back to first communication path to 312 and this is associated with bypassing fault and re-joins first communication path, and conditioning intermediate node to direct data from first label switched path to second label switched path in response to a fault on first communication path between intermediate node and destination node).

Regarding Claim 40, Kodialam et al. discloses comprising establishing said second label switched path in response to said fault (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 42, Kodialam et al. discloses comprising a plurality of intermediate nodes between said source node and said destination node, and each

connected to said second communication path by a respective intermediate communication path, and establishing said secondary label switched path to originate at the intermediate node which is selected based on the value of a parameter defining at least one of (a) each of said intermediate communication paths, and (b) each of said intermediate nodes (Fig. 3, element 302 (source node), elements 303, 304 (plurality of intermediate node) and element 312 (destination node). See paragraphs [0010,0028, 0036]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Each node is connected to a second path. Node 302 is connected to a second path from node 302 to 307 to 308 to 304. Node 303 is connected to a second path from node 303 to 308 to 304. Node 304 is connected to a second path from 304 to 309 to 310 to 311 to 312. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism associated with establishing secondary label switched path to originate at the intermediate node based on link weighting use to calculate the set of preferred paths which is equivalent to the value of a parameter defining each of intermediate communication paths).

Regarding Claim 43, Kodialam et al. discloses comprising selecting said secondary label switched path to originate at the intermediate node which is connected to said second label switched path by the intermediate communication path having the shortest data transmission time (See paragraph [0036]. Dynamic backup routing disclosed employs repeated invocations of a shortest path routing algorithm, such as

Dijkstra's algorithm, to generate links for the backup path. The shortest path routing is associated with communication path having the shortest data transmission time).

Regarding Claim 44, Kodialam et al. discloses further comprising determining which of said intermediate communication paths has the shortest data transmission time (Fig. 5. See paragraphs [0036 through 0041]. At step 503, the shortest path algorithm is executed from each node in the path from the current link to the destination. The shortest path algorithm is associated with the shortest data transmission time).

Regarding Claim 45, Kodialam et al. discloses comprising determining the values of said parameter (See paragraphs [0036]. Link weighting is implemented by assigning usage costs to back-up links based on a predefined cost criterion. Each preferred path has a minimum total weight between nodes as well as a minimum summed weight through nodes of the path, which is known in the art as shortest-path routing and this is associated with determining the values of said parameter).

Regarding Claim 46, Kodialam et al. discloses wherein said communication network comprises a plurality of intermediate nodes between said source node and said destination node, a respective second communication path extending from each of said plurality of intermediate nodes, and the method further comprises selecting one of said intermediate nodes and establishing said second label switched path originating at said selected intermediate node (Fig. 3, element 302 (source node), elements 303, 304

(plurality of intermediate node) and element 312 (destination node). See paragraphs [0010,0028, 0035, 0036]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Each node is connected to a second path. Node 302 is connected to a second path from node 302 to 307 to 308 to 304. Node 303 is connected to a second path from node 303 to 308 to 304. Node 304 is connected to a second path from 304 to 309 to 310 to 311 to 312. NTP requests arrive one-by-one. NTP requests are desirably routed by an on-line implementation of the dynamic backup routing algorithm that routes both the active path and the backup path for each link or node while meeting the service provider traffic engineering requirements. The NTP requests is equivalent to selecting one of intermediate nodes and establishing second label switched path originating at selected intermediate node incorporating MPLS restoration for LSP (label switched paths) for restoration mechanism).

Regarding Claim 47, Kodialam et al. discloses wherein the selected intermediate node is connected to a second communication path having the shortest transmission time (See paragraph [0036]. Dynamic backup routing disclosed employs repeated invocations of a shortest path routing algorithm, such as Dijkstra's algorithm, to generate links for the backup path. The shortest path routing is associated with communication path having the shortest data transmission time).

Regarding Claim 48, Kodialam et al. discloses comprising selecting said intermediate node based on the location of a fault on the first communication path (Fig.

3, element 302 (source node), elements 303, 304 (plurality of intermediate node) and element 312 (destination node). See paragraphs [0010,0028, 0035, 0036]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Each node is connected to a second path. Node 302 is connected to a second path from node 302 to 307 to 308 to 304. Node 303 is connected to a second path from node 303 to 308 to 304. Node 304 is connected to a second path from 304 to 309 to 310 to 311 to 312. When link between 303 and 304 fails in the first communication path, the data from first communication path is routed via second communication path 303 to 308 to 304 and back to first communication path to 312 and this is associated with selecting intermediate node (303) for redirection of data based on the location of a fault on the first communication path).

Regarding Claim 49, Kodialam et al. discloses a method of transmitting data specified for transmission on a first communication path between a source node and a destination node in response to a fault on said first communication path, comprising labelling said data with a label associated with a second communication path which adjoins said first communication path at first and second locations and which bypasses said fault, the distance between said first and second locations being less than the length of said first communication path, and outputting said labelled data onto said second communication path (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node). See paragraphs [0009, 0010, 0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to

312. Node 303 is connected to a second path from node 303 (first location) to 308 to 304 (second location). Fig. 3 shows a single-link failure of link l(303, 304), and the information transfer, since local restoration is employed, travels to only node 303, which initiates a transfer to a backup path (second communication path) over links l(303, 308) and l(308, 304) through node 308. The selected switching node 303 to link 308 and 304 is less than the length of first communication path (the primary path). The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism and is associated with labeling data with label associated with second communication path and outputting labeled data onto second communication path).

Regarding Claim 50, Kodialam et al. discloses comprising establishing a label switched path on said second communication path and wherein said label comprises a forwarding label of said label switched path (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism which is associated with establishing a label switched path on second communication path and wherein label comprises a forwarding label of label switched path).

Regarding Claim 51, Kodialam et al. discloses wherein said first location is situated between said source node and said destination node (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node).

See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Node 303 is connected to a second path from node 303 to 308 to 304. The first location is at intermediate node 303 situated between source and destination nodes).

Regarding Claim 52, Kodialam et al. discloses comprising an intermediate node at said first location, and establishing a label switched path on said second communication path originating at said intermediate node (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node). See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Node 303 is connected to a second path from node 303 to 308 to 304. The first location is at intermediate node 303. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism and is associated with establishing a label switched path on second communication path originating at intermediate node).

Regarding Claim 53, Kodialam et al. discloses wherein said second location is situated between said source node and said destination node (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node). See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Node 303 is connected to a second path from node 303 to 308 to

304. The second location is at intermediate node 304 situated between source and destination nodes).

Regarding Claim 54, Kodialam et al. discloses comprising an intermediate node at said second location, and directing data intended for transmission on said first communication path and received from said second communication path onto said first communication path at the intermediate switching router at said second location (Fig. 3, element 302 (source node), element 303 (intermediate node) and element 312 (destination node). See paragraphs [0028]. The first communication path is via nodes 302 to 303, 303 to 304 and 304 to 312. Node 303 is connected to a second path from node 303 to 308 to 304. The second location is at intermediate node 304 situated between source and destination nodes. When link between 303 and 304 fails in the first communication path, the data from first communication path is routed via second communication path 303 to 308 to 304 and back to first communication path at node 304 and this is associated with receiving from second communication path onto first communication path at the intermediate switching router at second location).

Regarding Claim 55, Kodialam et al. discloses wherein a first label switched path is established on said first communication path, and said method further comprises labelling said data with a label defining said first label switched path at said intermediate switching router (See paragraph [0010]. The Network Tunnel Path (NTP) disclosed incorporate MPLS restoration for LSP (label switched paths) for restoration mechanism

which is associated with a first label switched path established on first communication path, and labelling data with a label defining first label switched path at intermediate switching router).

5. Claims 73-74 are rejected under 35 U.S.C. 102(e) as being anticipated by Jain et al. (U.S. Patent No. 6,751,746).

Regarding Claim 73, Jain et al. discloses a method of selecting an alternative path for carrying data intended for transmission along a communication path between the source node and a destination node, comprising selecting a plurality of alternate paths connected between an intermediate node of said communication path and said destination node, and selecting from said plurality of alternate paths, the path which shares the minimum number of links with said communication path between said intermediate node and said destination node (Fig. 1B. col 2, lines 58-64; col 9, lines 17-23; col 10, line 48 through col 11, line 6. Two paths are link-disjoint if they do not have any link in common. The shortest link-disjoint path selection is associated with selecting from plurality of alternate paths, the path which shares the minimum number of links with communication path between intermediate node and destination node).

Regarding Claim 74, Jain et al. discloses further comprising selecting from said plurality of alternate paths, the path sharing the minimum number of intermediate nodes with said communication path between said intermediate node and said destination

node (Fig. 1B and Fig. 5. col 2, lines 58-64; col 9, lines 10-16; col 10, lines 4-46. Two paths are node disjoint if they do not have any node in common. The shortest node-disjoint path selection is associated with selecting from plurality of alternate paths, the path sharing the minimum number of intermediate nodes with communication path between intermediate node and destination node).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 16-18, 22, 24-25, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodialam et al. (U.S. Pub 2002/0067693) in view of Weil et al. (U.S. Pub 2002/0093954).

Regarding Claim 16, Kodialam et al. discloses all the limitations of claims 1,2 and 12 but does not disclose wherein said second switching router further includes signalling means for signalling said first switching router if said second switching router fails to determine a second communication path. Weil et al. discloses wherein said second switching router further includes signalling means for signalling said first

switching router if said second switching router fails to determine a second communication path (Fig. 3 see paragraphs [0032, 0049 through 0057]. Step 501, 502 and 503 performs the function of failure detection, failure signaling and based on the signaling switch over to recovery paths). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Regarding Claim 17, Kodialam et al. discloses all the limitations of claims 1, 2 and 12 but does not disclose wherein said first switching router is adapted to determine an alternative path which bypasses said location in response to said signal. Weil et al. further discloses wherein said first switching router is adapted to determine an alternative path which bypasses said location in response to said signal (Fig. 3 see paragraphs [0032, 0049 through 0057]. In step 503, once signaling the failure to an entity that can switchover to recovery paths, the switched traffic is thus routed around

the fault via the appropriate recovery path). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Regarding Claim 18, Kodialam et al. discloses all the limitations of claims 1, 2 and 12 but does not disclose wherein said first switching router is adapted to establish a second label switched path over said alternative path and direct data specified for transmission on said first communication path onto said second label switched path. Weil et al. further discloses wherein said first switching router is adapted to establish a second label switched path over said alternative path and direct data specified for transmission on said first communication path onto said second label switched path (Fig. 4, see paragraph [0106, 0107]. The second label switch path LSP-2 is the link via L, B, C and recovery path for LSP-2 is link via B, F ,G ,D). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling

mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Regarding Claim 22, Kodialam et al. discloses wherein said second communication path is selected to share the minimum number of switching routers with said first communication path (Fig. 3. See paragraph [0026]. The active path is determined based upon a criterion that the amount of bandwidth consumed by the active and backup path is at a relative minimum. The shortest-path computations yield active and backup paths satisfying the criterion. The backup path, once the active path is provisioned, is thus disjoint from the path including the point of failure, either i) link or ii) node failure, based upon local restoration routing. In Fig. 3,.the secondary paths {302 to 307 to 308 to 304}, {303 to 308 to 304} and {304 to 309 to 310 to 311 to 312} share the minimum number of switching routers with said first communication path designated by path from 302 to 303 to 304 to 312).

Regarding Claim 24, Kodialam et al. discloses all the limitations of claims 1 and 2 but does not disclose a fault detector for detecting a fault on the first communication path and transmitting a signal indicating the presence of said fault to said second switching router. Weil et al. discloses a failure detection mechanism for detecting a fault on the first communication path and transmitting a signal indicating the presence of said fault to said second switching router (Fig. 3, In Step 501 the failure is detected. The failure detection is associated with having a fault detector detecting the failure. See paragraphs [0050 through 0055]). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Regarding Claim 25, Kodialam et al. discloses all the limitations of claims 1 and 2 but does not disclose wherein said fault detector further includes means for detecting the location of said fault and transmitting a signal to at least one of said first and second

switching routers indicating at least one of the location of said fault and the element of said first communication path at which said fault is located. Weil et al. further discloses a means for detecting the location of said fault and transmitting a signal to at least one of said first and second switching routers indicating at least one of the location of said fault and the element of said first communication path at which said fault is located (Fig. 3, In Step 501 the failure is detected. The failure detection is associated with having a fault detector detecting the failure. See paragraphs [0050 through 0055]. A Fast Liveness Protocol (FLIP) is disclose to detect a link failure and in step 502, the failure signaling is performed). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Regarding Claim 41, Kodialam et al. discloses all the limitations of claim 39 but does not disclose establishing said label switched path in response to a signal

transmitted from said source node to said intermediate node. Weil et al. discloses establishing said label switched path in response to a signal transmitted from said source node to said intermediate node (Fig. 1, Fig. 3 and Fig. 4. See paragraph [0032, 0050 through 0054]. Signaling the failure to an entity that can switchover to recovery path is provided in step 502 using MPLS signaling protocol). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the signaling mechanism as taught by Weil et al. into the dynamic backup routing system of Kodialam et al. to provide a method of controlling re-routing of packet traffic from a main path to a recovery path in a label switched packet communications network in which each packet is provided with a label stack containing routing information for a series of network nodes traversed by the packet, the method comprising; signaling over the recovery path control information whereby the label stack of each packet traversing the recovery path is so configured that, on return of the packet from the recovery path to the main path, the packet has at the head of its label stack a recognizable label for further routing of the packet (see paragraph [0013]).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,904,018 to Lee et al. relates to a method for high speed rerouting in a multi protocol label switching (MPLS) network which can minimize a

packet loss and enable a fast rerouting of traffic so as to protect and recover a multi point to point LSP occupying most LSPs in the MPLS network.

U.S. Patent No. 6,856,592 to Grover et al. relates to a method of generating a set of eligible restoration routes for each span in the network, establishing a bi-criteria objective function in terms of route length and capacity cost for selecting a set of restoration routes.

U.S. Patent No. 6,744,727 to Liu et al. relates to techniques for determining a spare capacity allocation and optimizing a network restoration scheme.

U.S. Publication No. 2002/0186658 to Chiu et al. relates to a technique for selectively off-loading traffic from congested sub-regions of a network to more lightly-loaded regions by making use of Multiprotocol Label Switching (MPLS).

The above prior art are cited to further show the same field of endeavor with respect to the applicant's claimed invention.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to F. Lin Khoo whose telephone number is 571-272-5508. The examiner can normally be reached on flex time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on 571-272-3134. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WELLINGTON CHIN
RVISORY PATENT EXAMIN